

**STRATEGY  
RESEARCH  
PROJECT**

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**AIR SUPPORT TO LAND COMPONENT OPERATIONS**

**BY**

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**Air Support to Land Component Operations**

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## **ABSTRACT**

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This project addresses air support to land component operations.

Air support includes air interdiction and close air support.

The project examines current U.S. air support doctrine and reviews the Operation Desert Storm experience pertaining to air support. A crosswalk is conducted between Desert Storm air support issues and specific features of current doctrine. The project provides recommendations to warfighting Commanders in Chief on measures to ensure effective air support within their command and proposes a far term approach for Joint Vision 2010.



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## AIR SUPPORT TO LAND COMPONENT OPERATIONS

*We don't believe in direct air support in the IAF...We have never believed in close support...Instead of using 'close support' we talk of 'participating' in the ground battle, which has a different connotation, and 'participating' means how can we, with airpower, make the ground battle easier, cheaper.*

— Major General Mordechai Hod<sup>1</sup>  
Commander, Israeli Air Force (IAF), 1966-1973

The spectacular success of the air campaign during Operation Desert Storm certainly made the ground campaign "easier and cheaper." Coalition air forces crippled the Iraqi war machine, then coalition land forces, with air support, delivered a knockout blow sooner and with fewer casualties than anyone had anticipated. Despite this success, air support doctrine should not remain static if improvements are needed. The Desert Storm experience suggests that changes may be warranted for several reasons, including: the increased effectiveness of airborne sensors and weapon systems; debate over targeting and air support responsiveness; lack of deep fires integration; and the need to avoid air-to-ground and air-to-air fratricide. This paper examines current air support doctrine within the context of the Desert Storm experience and highlights some key points to ensure the success of air support of land component operations in the near term future. Also, the paper proposes a new approach for the far term future - an

approach in which air and land components will fully "participate" to achieve decisive victory on the next century's battlefields.

## **BACKGROUND**

### CURRENT DOCTRINE

This paper addresses air support of land component operations from the standpoint of air operations being conducted against enemy ground forces in a land component's area of operation (AO). Within this context, air support consists of air interdiction (AI) and close air support (CAS). AI missions are conducted to destroy, neutralize, or delay enemy land forces before they can bring their firepower to bear effectively against friendly land forces.<sup>2</sup> CAS missions augment the land component's organic supporting fires to attack enemy land forces in close proximity to friendly land forces.<sup>3</sup> CAS missions are classified as preplanned if targets are known to exist in the land component's AO and attacks are planned against these targets. Preplanned CAS missions are further subdivided into scheduled missions for targets with known attack times and on-call missions for targets with unknown attack times. CAS missions can also be classified as immediate for unanticipated

or previously unplanned targets. Figure 1 depicts the elements of air support.

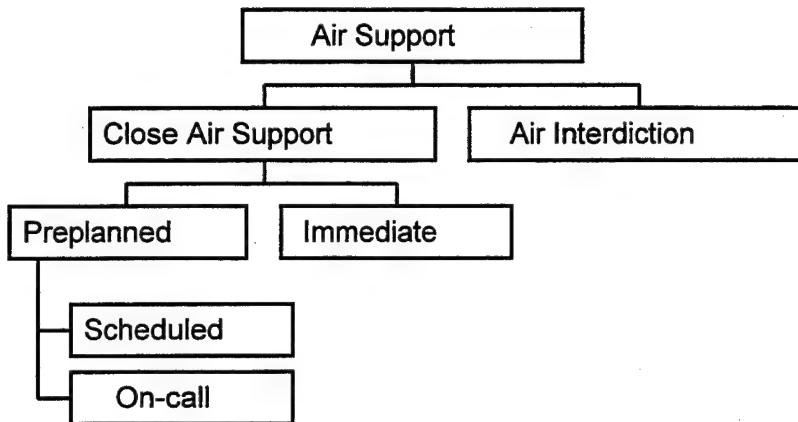


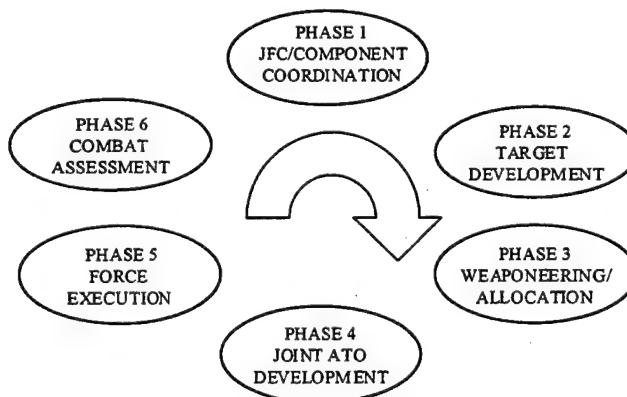
Figure 1 - Current Air Support

The general nature of AI is much different than CAS. AI missions are conducted to achieve operational- or tactical-level objectives and indirectly affect the enemy's ability to conduct combat operations against friendly forces. Typically, AI missions are conducted against a more vulnerable enemy, e.g. forces in an assembly area or convoy.<sup>4</sup> On the other hand, CAS missions are conducted to achieve strictly tactical-level objectives and their effects on the enemy are more direct, but of lesser magnitude than AI missions. CAS missions are conducted against a less vulnerable enemy, e.g. forces in contact which are deployed in battle formation and better prepared to defend themselves. AI is the more efficient type mission, because it has a greater effect on the enemy. However,

efficiency is not a major factor in the midst of a close battle when a land component commander has a compelling need for augmentation of his organic fires to accomplish his mission. Thus, AI and CAS are both diverse and essential air support missions.

AI and CAS have several distinctions from a doctrinal standpoint. One key distinction is that a land component commander (LCC) is in charge of target selection for CAS missions, but the Joint Force Air Component Commander (JFACC) normally allocates missions to attack AI targets.<sup>5</sup> An LCC and his staff determine where CAS can enhance the unit's mission accomplishment and submit a request for CAS to the JFACC staff. The JFACC staff reviews the request and fills it, if sorties are available to execute the mission.

While an LCC can nominate AI targets, AI targets are typically selected by the JFC or JFACC staff during a six phase joint air tasking cycle. This cycle is depicted in Figure 2.<sup>6</sup>



(

Figure 2 - Joint Air Tasking Cycle

During Phase 1 (JFC/Component Coordination), the JFC consults with his commanders, issues planning guidance for the apportionment of air assets, and sets targeting priorities.<sup>7</sup>

During Phase 2 (Target Development), the JFACC/JFC staff develop a prioritized list of targets with support from components. A JFC may establish a joint targeting coordination board (JTCB), composed of representatives of the JFC staff and all components, to oversee the targeting process and provide advice to the JFC.<sup>8</sup>

During Phase 3 (Weaponeering/Allocation), the staff selects the appropriate weapons to attack targets and allocates the number of aircraft sorties for each mission. During Phase 4 (Joint ATO Development), an air tasking order (ATO) is developed which tasks specific units to conduct the missions identified in the order. Typically, ATO preparation begins 48 hours in advance and is issued within 12 hours of mission time. During Phase 5 (Force Execution), tasked units execute their assigned mission. In this phase, air operations may be redirected due to developments on the battlefield and feedback from in-flight reports. During Phase 6 (Combat Assessment), an assessment is done at all levels of the force to determine battle damage assessment (BDA), weapons effectiveness, and reattack options.

Another distinction between AI and CAS is that AI missions are conducted against enemy forces not in close proximity with friendly forces and, therefore, do not require detailed integration between friendly air and land forces. However, CAS missions are conducted when land forces are in close proximity and therefore require detailed integration. This integration is typically implemented via ground or airborne forward air controllers (FACs).

A concept that can be employed to ensure effective CAS integration is the joint air attack team (JAAT). A JAAT operation is conducted with organic land component fire support weapon systems and air component assets under tactical control of the mission commander.<sup>9</sup> An engagement area (EA) is established for the JAAT where the land component commander intends to strike the enemy. Also, an airspace coordination area (ACA) is established to deconflict land component and air component aircraft, as well as land component indirect fires.

An LCC establishes a fire support coordination line (FSCL) to coordinate fires of all types against targets in his AO. Air attacks of targets inside the FSCL must be coordinated with the LCC. Air attacks beyond the FSCL do not require coordination, if they do not produce adverse surface effects on or behind the FSCL, e.g. air-to-ground fratricide. In general, AI missions are conducted forward of the FSCL to support deep operations,

whereas CAS missions are conducted inside it to support close operations.

Another measure available to coordinate air support is a grid box reference system. This system provides a common frame of reference for all components in a theater. The size of individual grid boxes depends on the effects and employment tactics of the weapons utilized in conjunction with the reference system. According to the multiservice FM 90-36, Targeting: The Joint Targeting Process and Procedures for Targeting Time - Critical Targets, the optimal horizontal dimensions of a grid box for air support aircraft are 15 minutes latitude by 15 minutes longitude, which equates approximately to a 15 X 15 nautical mile box.<sup>10</sup> Vertical dimensions of grid boxes are situationally dependent. Grid boxes are labeled with an alphanumeric identifier according to their position in the grid. Figure 3 depicts how a grid box is labeled and identified within the reference system, i.e. the black grid box D-8.<sup>11</sup> Although grid boxes are not fire support or airspace coordination measures, they facilitate the employment of such measures, e.g. EAs and ACAs.

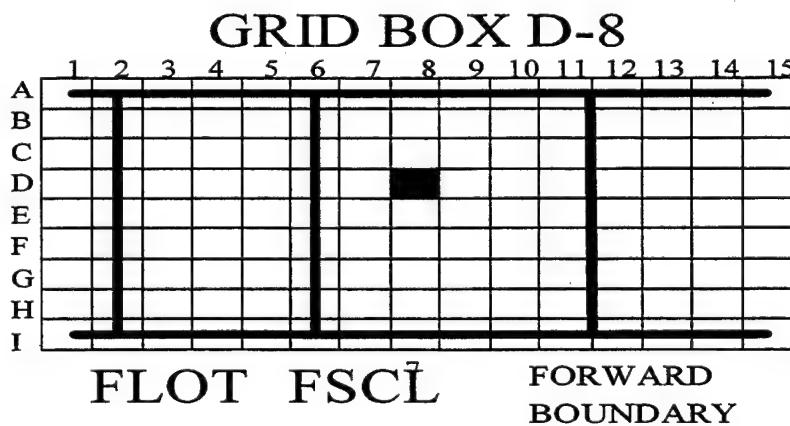


Figure 3 - Grid Box Labeling and Identification

The Marines have a service-level air support concept known as offensive air support (OAS). OAS consists of CAS and deep air support (DAS).<sup>12</sup> DAS is further sub-divided into AI and armed reconnaissance missions. The distinction between the two DAS missions is that AI is conducted against targets known in advance of the mission while armed reconnaissance is conducted against targets not known in advance. Figure 4 depicts the elements of OAS.<sup>13</sup>

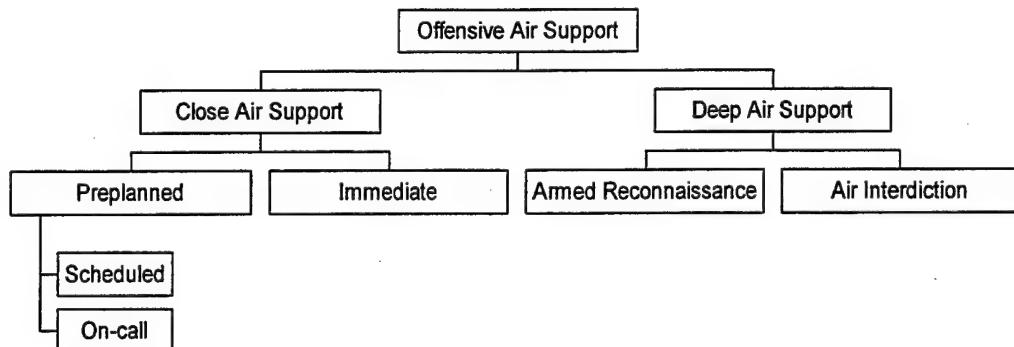


Figure 4 - Marine Corps Offensive Air Support

#### THE AIRCRAFT

U.S. aircraft capable of performing air support missions include attack helicopters and fixed-wing aircraft. Attack helicopter ordnance includes guided missiles to attack armored vehicles, as well as rockets and cannon to attack troops and

artillery.<sup>14</sup> Although very capable at night, helicopters are limited by adverse weather. The Army's primary attack helicopter is the AH-64 Apache. The Apache Longbow program is underway to improve the aircraft's target acquisition, engagement, and adverse weather capabilities.<sup>15</sup> While the Army considers the Apache primarily a maneuver platform, it can be employed in either CAS or AI missions. The Marines' attack helicopter is the AH-1W Supercobra, which is used primarily to escort transport helicopters but can be used in CAS missions.

Fixed-wing aircraft can carry a wider variety of ordnance than attack helicopters, including heavy bombs, which can be used against hardened targets. Also, fixed-wing aircraft can fly at greater speeds and higher altitudes to avoid enemy air defense systems more effectively.<sup>16</sup> The services have been upgrading fixed-wing aircraft to operate at night and in adverse weather. The Air Force's primary air support fixed-wing aircraft include the A-10 Thunderbolt, F-16 Fighting Falcon, and F-15E Strike Eagle. The Marines have the AV-8B Harrier and F/A-18 Hornet. The Navy has the F/A-18 and F-14 Tomcat. Of these aircraft, only the A-10 has a CAS-unique design and is used primarily for this mission. While the AV-8 is a multi-role aircraft, the Marines employ it primarily in CAS missions. The Marines rely greatly on CAS due to their expeditionary-type role and their forces are structured accordingly. Compared to an

Army mechanized division, a Marine division has roughly 77% fewer tanks.<sup>17</sup> The Marines make up for this reduced amount of land-based firepower with air power.

## THE DESERT STORM EXPERIENCE

### Predominance of Air Interdiction

The closest thing we had to classical...close air support was the 2d Cavalry. They were the covering force, and they had what we visualize close air support to be - aircraft attacking targets that are in the same battle space as ongoing direct fire engagements. Most of the time it just was not the right thing to do with the air, it did not complement the direct fire fight. Our direct fire systems were doing fine in that kind of exchange, and where we needed the air was a little deeper.

LTG Fred Franks<sup>18</sup>  
Commander, VII Corps

The Desert Storm air campaign was executed in four phases: strategic attack; suppression of enemy air defense; shaping of the battlefield; and ground campaign support. The first three phases were conducted mostly on a concurrent basis and continued until the end of the war. The battlefield shaping phase was an AI effort. The ground support phase included both AI and CAS, although relatively little air support was employed as CAS. In fact, the Army was provided with more traditional CAS than it needed.<sup>19</sup> To maximize the utility of CAS missions, air component forces employed a technique known as "push" or "flow" CAS that enabled CAS sorties to divert to AI missions if required.<sup>20</sup>

Ultimately, the bulk of these type missions ended up as AI missions.<sup>21</sup> Even the Marines, who owned an organic fixed-wing CAS and placed a greater reliance on CAS missions, ended up handing off CAS sorties to AI missions.<sup>22</sup> For the 43 days of Desert Storm, 88% of all U.S. fixed-wing air support sorties were classified as AI missions.<sup>23</sup> This predominance of AI was due to several factors, including a successful counter air campaign which ensured freedom of action, an open desert terrain which aided the detection and attack of enemy land forces, and the short duration of the land campaign.

The availability of airborne sensors and the use of "kill boxes" in Desert Storm also played a key role in interdicting Iraqi forces on the battlefield. The Air Force's Joint Surveillance Target Attack Radar System (JSTARS) provided an invaluable all-weather, day-night capability to detect moving Iraqi vehicles with sufficient accuracy to attack with aircraft or indirect fires.<sup>24</sup> The Army and the Marines augmented JSTARS coverage with Pioneer unmanned aerial vehicles (UAVs) and the Army had access to the French Horus helicopter-borne radar. Also, intelligence aircraft, including the RF-4C Phantom II, RC-135 Rivet Joint, and TR-1/U-2, were available in theater to provide an awareness of the Iraqis' activities.<sup>25</sup>

Air Force, Central Command (AFCENT) implemented a kill box technique to take advantage of a "target-rich" environment and

to attack targets which proved difficult to detect, such as dug-in tanks. Thirty by thirty mile boxes were arrayed in a common grid reference system for the entire theater of operations. Two very successful tactics were employed to detect and attack targets in kill boxes. F-16 "Killer Scouts", flying armed reconnaissance missions, patrolled kill boxes by day to validate known targets, to find new ones, and in some cases, to attack targets.<sup>26</sup> At night, F-111, F-15E, and A-6 aircraft, equipped with target acquisition sensors and laser guided bombs, engaged in "tank plinking".<sup>27</sup> Notably, 53% of all air strikes on ground targets occurred in kill boxes.<sup>28</sup>

Despite their utility, the Army had some concerns over kill boxes. They were under Air Force control and, consequently, Army commanders were not always aware of what targets had been attacked.<sup>29</sup> Also, the boxes were positioned based on "geometric convenience" rather than the Army commanders' scheme of maneuver or the enemy's position.

The effectiveness of land component weapon systems was also a contributing factor to the relatively small amount of traditional CAS during Desert Storm. The Army's Apache attack helicopter was very effective throughout the battlefield, particularly at night when it was less vulnerable to ground fire. Despite its limited quantities, the Army Tactical Missile System (ATACMS) proved to be a very capable deep strike weapon

against challenging, time sensitive targets.<sup>30</sup> In the close fight, the Army and Marine Abrams main battle tank displayed considerable overmatch in terms of both target acquisition range and lethality.<sup>31</sup>

#### **Army/Air Force Issues**

*But when we started shaping the battlefield - when it became crystal clear that we were going to have to get into the ground campaign - it became awful important for someone to really see what was going to happen on the battlefield. I became very uneasy with the way I saw the air being apportioned.*

LTG Calvin Waller<sup>32</sup>  
Deputy CINC, Central Command

#### Targeting

Two major air support-related issues arose between the Army and Air Force during Desert Storm, the first of which involved the targeting process. During the air campaign, tension mounted between Army and Air Force officers over the focus of air operations. Air Force officers saw the strategic attacks on Iraq's centers of gravity as the most effective use of air power.<sup>33</sup> Army officers, faced with the prospect of direct combat with an entrenched enemy, were more concerned about shaping the battlefield and achieving the CINC's stated objective of reducing Iraqi ground forces by 50% before initiation of the ground campaign.<sup>34</sup> In early February, Army leaders approached the CINC with a request to increase the number of missions for

shaping the battlefield and to have the Deputy CINC oversee target nominations of land commanders. The CINC approved the request and the apportionment of air assets was changed accordingly to reduce the strategic attack effort and to increase the AI effort.<sup>35</sup>

The Army's nomination of targets then became an issue. Army leaders held the impression that the JFACC staff had not changed targeting priorities.<sup>36</sup> Part of this perception resulted from the JFACC staff's high degree of control over target selection, a situation stemming from the CINC's total empowerment of the JFACC to conduct the air campaign. During the war, just over a third of Army nominated targets were attacked.<sup>37</sup> Many of the Army's nominations were considered obsolete by the Air Force, as pilots would discover that targets had moved or had been attacked previously. Also, Army had difficulty meeting requirements for target location accuracy or target revalidation by intelligence sources prior to mission times.<sup>38</sup> Accentuating the target nomination issue was the Army's initial expectation that battlefield air interdiction (BAI) would be conducted. Under a 1984 agreement between the Army and Air Force, BAI had been established as a subset of AI in which attacks would be dedicated to targets nominated by Army commanders.<sup>39</sup> However, the JFACC, LTG Horner, chose not to recognize BAI as a separate

category during Desert Storm. His position was that the massive coalition air campaign needed to be kept as simple as possible.<sup>40</sup>

#### Deep Fires Integration

A second issue between the Army and Air Force was the lack of deep fires integration. The Apache and Army Tactical Missile System (ATACMS) proved to be highly effective deep attack weapons, yet the Army rarely coordinated use of these systems with the Air Force. Central to this issue was the Army's concern over Air Force control of these systems. Army commanders wanted to ensure Army deep attack systems were responsive to their needs, so they resisted including such systems in ATOs. Consequently, Army deep operations and Air Force AI missions were largely independent efforts. In one instance during the ground campaign within the VII Corps AO, the opportunity arose to conduct an integrated attack with Apaches and F-111's.<sup>41</sup> However, LTG Franks, the corps commander, opted for separate attacks, because a method of integration had not been developed and he did not want to attempt untried integration in combat.

Debate between the Army and Air Force over FSCL placement also complicated deep fires integration. During the ground campaign, the Army moved the FSCL from a nominal distance of 15 km in front of friendly troops to 100 km.<sup>42</sup> While this was convenient for the Army and ensured freedom of action for its

attack helicopters, Air Force AI aircraft, with far more ordnance, were restricted from attacking targets in a large area of the battlefield. The timing of FSCL changes was also a problem. In one case, the Air Force requested that the Army delay an FSCL move to complete a planned B-52 strike. An ensuing debate over when to move the FSCL created a virtual sanctuary and prevented the Air Force from attacking an estimated 600 Iraqi tanks which were ultimately saved by the war's cease fire.<sup>43</sup>

#### **Marine/Air Force Issue**

The JFACC process of having one single manager has its limitations, as does every system. It does not respond well to a quick-action battlefield. If you're trying to build a war for the next 72 to 96 hours, you can probably build a pretty good war. But if you're trying to fight a fluid battlefield like we were on, then you need a system that can react.

LTG Royal N. Moore, Jr., USMC<sup>44</sup>  
Commander, 3d Marine Aircraft Wing  
During Desert Shield/Storm

The control of Marine air support became an issue between the Air Force and Marines during Desert Storm. The Marines did not believe in the centralized control of the JFACC and were reluctant to support the overall air campaign.<sup>45</sup> The Marines tended to focus on tactical-level objectives and providing responsive air support to ground commanders. Because they owned the aircraft being tasked in ATOs, the Marines were able to

adjust which targets their organic aircraft attacked by manipulating the ATO process. As recounted by a JFACC planning officer,

The Marines were bypassing the planning cells where we constructed the Master Attack Plan, which designated targets and force packages to attack them...They would go to the ATO cell late at night and give the "changes" to the ATO operators. They would present what they were trying to do as "changes" to the process and give them to the guys processing the ATO.<sup>46</sup>

Also, staff officers would list the targets they wanted to strike as alternates. Near mission time, they would call the appropriate air wing and request that the alternate targets be attacked.<sup>47</sup>

### **Fratricide**

Although no air-to-ground or air-to-air fratricide incidents occurred during AFCENT support of Army operations, the risk of fratricide existed due to the lack of coordination between the two services at times. In one case, an Air Force A-10 began to initiate the attack of some unidentified tanks in its assigned kill box. After verifying with an Air Force ground element that no friendly forces were in the area, the pilot observed the tanks conduct breaching action and move north to an apparent attack position.<sup>48</sup> Upon regaining contact with the ground element, the pilot was informed that the vehicles were indeed friendly. In another incident, a pair of Air Force F-15s almost engaged two Army helicopters supporting a Special Forces

operation.<sup>49</sup> These helicopters had not been listed on the ATO, so their flight was unknown to AFCENT. The Army did experience an internal fratricide incident when an Apache engaged friendly ground vehicles in proximity of enemy forces.

The British Army and U.S. Marines were less fortunate. During one incident, two A-10's, under the impression that friendly forces were not in their vicinity, attacked two British tanks mistaken for T-55's.<sup>50</sup> The Marines experienced three air-to-ground fratricide incidents. In one case, two Air Force A-10s mistakenly attacked Marine reconnaissance vehicles operating forward of the FSCL.<sup>51</sup> In another case, an Air Force A-10 attacked a Marine light armored vehicle while under control of a Marine ground FAC. After these incidents, the Marines adopted a policy of only Marine aircraft providing CAS to Marine ground forces. Nevertheless in a subsequent incident, a Marine A-6, cleared by a Marine airborne controller, failed to verify the its position and mistakenly attacked a Marine convoy. Based on conjecture, the Marines' higher incidence of fratricide than the Army may have been due to the greater number of CAS sorties operating in close proximity of their ground forces.

## **NEAR TERM AIR SUPPORT**

### CURRENT DOCTRINE VERSUS DESERT STORM ISSUES

Crosswalking the particulars of current doctrine with the air support issues of Desert Storm reveals that current doctrine adequately addresses most of these types of issues. All joint and multiservice publications pertaining to air support have been revised or issued since Desert Storm and are thus current. The approach to air support in the near term need not be changed significantly. However, the familiarity of joint forces and their components with current doctrine is required. The following key points should promote effective air support.

### JFC/COMPONENT COORDINATION

Coordination between a JFC and his component commanders is the first vital step in the air tasking cycle. Despite tension between Army and Air Force over apportionment of strategic attack versus battlefield shaping, this step worked during Desert Storm. The air campaign started with a focus on strategic attack, and then the CINC shifted it to battlefield shaping on the advice of his land component commanders. Perhaps communications between the CINC and the component commanders could have better to reduce some of the friction, but the CINC fulfilled his responsibility for providing air tasking guidance.

#### JOINT TARGET DEVELOPMENT

The JFACC staff was empowered by the CINC to conduct what amounted to unilateral target development during Desert Storm. Although Army commanders were nominating targets for the battlefield shaping phase, target selection was not done on a joint basis. While the JFACC staff's target development efforts fully supported the CINC's guidance, the situation was fraught with the risk of antagonizing land component officers. Current doctrine supports the JFACC staff having the lead for target development, but it also advocates participation by other components. Additionally, establishment of a formal JTBCB ensures that all components are represented in target development. With regards to BAI, this concept need not be resurrected, if the target development process is truly joint.

#### JOINT ATO DEVELOPMENT

The Marines' manipulation of the ATO process and Army's efforts to avoid it during Desert Storm were unfortunate. There is no doctrinal reason for land component aircraft and deep attack systems, such as ATACMS, not to be included in ATOs. Incorporation of these systems into the ATO would ensure unity of effort in deep operations and give all commanders, including the JFC, JFACC, and land component commanders visibility into theater air operations. This visibility would ensure that no

gaps existed in air operations and prevent duplication of effort between air and land components. If ATO development is truly a joint venture, perhaps land components will be more likely to support it in the future.

#### JOINT AIR ATTACK TEAMS

The utilization of JAATs is currently addressed as an air support integration measure in Joint Pub 3-09.3, Joint Tactics, Techniques, and Procedures for Close Air Support (CAS).

Although JAATs are not addressed explicitly in AI-related doctrinal publications, AI missions could readily support JAATs. Instead of conducting independent deep operations, as in Desert Storm, the land and air components could form JAATs to strike deep targets. A beneficial employment of a JAAT would be to utilize ATACMS initially in a suppression of enemy air defense (SEAD) role, then attack the desired target with AI aircraft. Such an employment would enable deep SEAD to be conducted without putting aircrews in jeopardy.

#### BATTLEFIELD RESPONSIVENESS

During Desert Storm, the Marines held the view that the centralized control of the ATO process could not respond quickly enough to a dynamic battlefield. Although this perspective may be difficult to prove or disprove, joint doctrine clearly addresses this issue, as the LCC is now considered the supported

commander and can determine specific targets for interdiction missions in his AO.<sup>52</sup> Also, greater land component participation in the target development would help ensure that air support missions meet the needs of LCCs.

The ability to redirect air operations during the mission execution phase of the air tasking cycle is equally important to battlefield responsiveness. The multiservice FM 90-36 provides doctrine for attacking surface time-critical targets (TCTs) and targets of opportunity (TOOs). Surface TCTs are lucrative land targets, which warrant high priority by the JFC or a component commander and, thus, require a rapid response.<sup>53</sup> TOOs are also lucrative targets, but do not have a high priority designation by the JFC or a component commander.<sup>54</sup> The framework for attacking these targets follows one similar to CAS, i.e. scheduled and on-call missions against planned targets and immediate missions against unplanned or unanticipated targets. Figure 5 depicts this framework.<sup>55</sup>

PLANNED TARGETS (KNOWN)		IMMEDIATE TARGETS	
SCHEDULED	ON-CALL	UNPLANNED TARGETS (KNOWN)	UNANTICIPATED TARGETS (UNKNOWN)
<b>SURFACE TCTs</b>			
<b>TOOs</b>			

Figure 5 - Surface TCTs and TOOs

## GRID BOX REFERENCE SYSTEM

The success of kill boxes during Desert Storm validates the grid box reference system, a concept which merits routine use by both air and land components in the future. Utilization of a grid box reference system by land components, as well as the air component, would address the concerns over kill box (EA) control raised by Army commanders during Desert Storm. This system is not for the sole use of the air component.

The concern over "geometric convenience" could be addressed by involving land component commanders during the initial establishment of a theater's grid box reference system. Also, smaller grid boxes would give better resolution of the battlefield and may be more suitable for ground operations. The 30X30 mile grid box used in Desert Storm may have been suitable for fixed wing aircraft in an open desert environment, but the 15X15 mile grid box recommended in current doctrine would probably be more appropriate in most other locations. Ideally, the air and land components should jointly assess the situation and determine the right size of grid boxes.

## FSCL PLACEMENT

FSCL placement should be based on current doctrine and not skewed by land components to maximize their systems' freedom of action, as was done in Desert Storm. Such misuse of the FSCL

only serves to disrupt the theater-wide AI campaign and could inadvertently create a sanctuary for enemy forces as happened in Desert Storm. Land components should focus on the use of a grid box reference system to establish coordination measures for deep strikes and consult with the air component to position the FSCL where it can maximize the effectiveness of air support. Also, land components should be familiar with the variety and amount of air support aircraft munitions to appreciate the extent of firepower available for use on the battlefield.

#### FRATRICIDE AVOIDANCE

If air support aircraft used EAs routinely in conjunction with their missions and these EAs were clearly called out in the ATO, then land components would know of these preplanned missions and land component forces could avoid these areas. Immediate missions conducted in response to the changing battlefield certainly present a challenge. However, to the extent possible, air liaison officers should keep their supported land components informed of active EAs. If land component attack helicopters were included in the ATO, air component aircrews would be more aware of the helicopters' presence on the battlefield. In general, the more that EAs and ATOS are used by air and land components, the greater their

level of situational awareness and the greater likelihood that fratricide can be avoided.

#### ARMED RECONNAISSANCE

One missing piece in current joint and multiservice doctrine is a clear description of the armed reconnaissance mission. It is not identified as a distinct mission in joint or multiservice air support doctrine, like it is in Marine service doctrine. It fits within the broad definition of AI in terms of attacking enemy forces; however, it is also a "reconnaissance" mission to locate targets. Regardless of how armed reconnaissance is conveyed in doctrine, the success of "Killer Scouts" during Desert Storm merits its continued use. The Marines treat armed reconnaissance as an economy of force effort.<sup>56</sup> In this capacity, armed reconnaissance aircraft can serve as a covering force for land components. Also, they can augment theater reconnaissance and intelligence assets to detect targets.

## FAR TERM AIR SUPPORT

A new chapter in warfare was written on 17 January 1991. With the advent of postindustrial warfare, informational warfare, or knowledge warfare - whatever one might choose to call it - a window opened, giving discerning people an opportunity to gaze into the future. Although the view remains blurred and imperfect, warriors who make the most of it increase their chances for victory in the next round.

Edward C. Mann III  
COL, USAF<sup>57</sup>

The predominance of AI during Desert Storm is notable and suggests that the nature of air support to land component operations is changing. In effect, the success of AI in the Gulf War offered a glimpse into Joint Vision 2010 and its central theme of Information Superiority. As U.S. air and ground forces rely increasingly on airborne sensors and data networks to link those sensors with command and control centers and weapon platforms, it is conceivable that the 20<sup>th</sup> century concepts of CAS and AI could be consolidated into a single air support concept for 21<sup>st</sup> century warfare. This concept would be responsive to the needs of land component commanders from company-level to JFCs and flexible enough to achieve operational- and tactical-level objectives throughout the battlefield. An apt title for this concept would be "Counterland" air operations, found in Air Force Doctrine Document 1.<sup>58</sup> Although today the Air Force uses "Counterland" simply as new terminology for "Air Support", "Counterland" is a

contemporary term that could be used to connote a new concept for air support in the future.

The framework for the new Counterland concept would be based on target type rather than on proximity of forces. That is, the concept would include scheduled and on-call missions to attack preplanned targets and immediate missions to attack unplanned or unanticipated targets. This framework is similiar to that of CAS; however, FACs and other means to acheive "detailed integration" would be replaced with extensive use of airborne sensors, realtime data links, friendly ground vehicle identification devices, and fire support/airspace control measures. Also, targets would be attacked throughout the extent of the battlefield. Figure 6 depicts the elements of Counterland air operations.

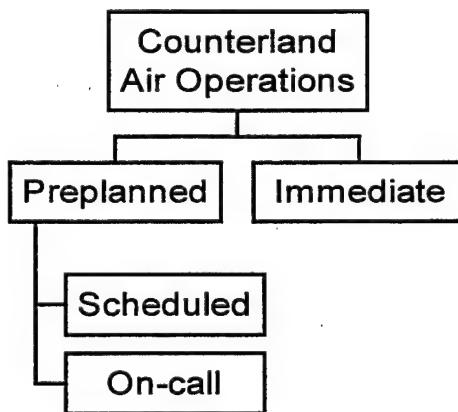


Figure 6 - Counterland Air Operations

## CONCLUSION

The air support efforts by U.S. forces in Desert Storm were remarkable and played a significant role in winning the war. "Push/flow" CAS, "kill boxes", "Killer Scouts", and "tank plinking" were creative adaptations of the traditional CAS and AI missions which proved to be quite successful. Despite this success, some issues centering on doctrine arose. There were concerns over air apportionment, target selection, deep fires integration, and air support responsiveness. Although fratricide incidents were relatively few in number, they did occur. Fortunately, the Department of Defense has been diligently revising joint doctrine since the war. Today and in the near term, joint forces and their components need only study and practice this doctrine to avoid repetition of the Desert Storm air support issues.

The far term is a different story. The predominance of AI during Desert Storm serves as a window into the future of Joint Vision 2010 and its reliance on Information Dominance. A new concept is called for which makes extensive use of airborne sensors and robust data networks to see and attack enemy land forces anywhere and at anytime on the battlefield.

## **RECOMMENDATIONS**

Warfighting CINCs and their components should consider the following recommendations to enhance air support of land component operations in their regions:

- 1) JFCs should coordinate closely with all their component commanders on apportionment and targeting priorities. JFC guidance for air support must be understood by all components.
- 2) Although the JFACC will have the lead in the air tasking process, all components should be represented during target development.
- 3) All component attack systems supporting deep operations should be included in the ATO.
- 4) JAATs should be used when appropriate to integrate deep strike missions.
- 5) The redirection of air operations to attack surface TCTs and TOOs should be exercised to ensure battlefield responsiveness.
- 6) The grid box reference system should be used by all components to coordinate air support missions.
- 7) Air components should have input to FSCL placement to ensure the maximum effectiveness of air support.
- 8) Airborne armed reconnaissance missions should be used to augment theater reconnaissance and intelligence assets.

The Joint Staff should review current air support doctrine and determine how best to incorporate the armed reconnaissance mission. For the far term, the Joint Staff should appoint a Joint Warfighting Capabilities Assessment (JWCA) team to assess the feasibility of a single "Counterland" concept and its potential impacts on force structure and equipment.

WORD COUNT = 5,695.

## ENDNOTES

<sup>1</sup> Benjamin Franklin Cooling, Case Studies in the Development of Close Air Support (Washington, D.C.: Office of Air Force History, 1990), 491.

<sup>2</sup> Joint Chiefs of Staff, Department of Defense Dictionary of Military and Associated Terms, Joint Publication 1-02 (Washington, D.C.: U.S. Joint Chiefs of Staff, 23 March 1994), 16.

<sup>3</sup> Ibid, 70.

<sup>4</sup> John A. Warden, The Air Campaign: Planning for Combat (Washington, D.C.: National Defense University Press, 1988), 160.

<sup>5</sup> Department of the Army, Tactics, Techniques, and Procedures for the Targeting Process, Field Manual 6-20-10 (Washington, D.C.: U.S. Department of the Army, 8 May 1996), 3-2.

<sup>6</sup> Joint Chiefs of Staff, Command and Control for Joint Air Operations, Joint Publication 3-56.1 (Washington, D.C.: U.S. Joint Chiefs of Staff, 14 November 1994), IV-4.

<sup>7</sup> Ibid, IV-6 - IV-7.

<sup>8</sup> Ibid, IV-2.

<sup>9</sup> Department of the Army, JAAT: Multiservice Procedures for Joint Air Attack Team Operations, Field Manual 90-21 (Washington, D.C.: U.S. Department of the Army, 3 June 1998), I-1.

<sup>10</sup> Department of the Army, Targeting: The Joint Targeting Process and Procedures for Targeting Time - Critical Targets. Field Manual 90-36 (Washington, D.C.: U.S. Department of the Army, 25 July 1997), II-15.

<sup>11</sup> Ibid, II-19.

<sup>12</sup> Marine Corps, MAGTF Aviation Planning, Fleet Marine Force Manual 5-70 (Washington, D.C.: Headquarters, U.S. Marine Corps, 8 June 1995), 10-1.

<sup>13</sup> Ibid.

<sup>14</sup> General Accounting Office, Combat Air Power: Assessment of Joint Close Support Requirements and Capabilities Needed (Washington, D.C.: U.S. General Accounting Office, June 1996), 15.

<sup>15</sup> Department of the Army, Weapon Systems (Washington, D.C.: Office of the Assistant Secretary of the Army (Research, Development, and Acquisition), 1998), 87.

<sup>16</sup> GAO Report, 15.

<sup>17</sup> "1998 Almanac", Marines. (January 1998): 18 and "Employing A US Army Corps: How the Corps Fights" (U.S. Army War College CBNET P drive, 11 September 1998), 13.

<sup>18</sup> P. Mason Carpenter, Joint Operations in the Gulf War: An Allison Analysis (Maxwell Air Force Base, AL: Air University, February 1995), 59.

<sup>19</sup> Ibid.

<sup>20</sup> Robert H. Scales, Certain Victory: The U.S. Army in the Gulf War (Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 1994), 189.

<sup>21</sup> Carpenter, 60.

<sup>22</sup> Charles D. Melson, Evelyn A. Englander, David A. Dawson, U.S. Marines in the Persian Gulf, 1990-1991: Anthology and Annotated Bibliography (Washington, D.C: History and Museums Division, Headquarters, U.S. Marine Corps, 1992), 126.

<sup>23</sup> Elliot A. Cohen, Gulf War Air Power Survey (Washington, D.C.: Office of the Secretary of the Air Force, 1993), Volume V, 232.

<sup>24</sup> Scales, 167.

<sup>25</sup> Edward C. Mann III, Thunder and Lightning: Desert Storm and the Airpower Debates (Maxwell Air Force Base, AL: Air University Press, 1995), 150.

<sup>26</sup> Cohen, Volume IV, 225.

<sup>27</sup> Cohen, Volume II, 102.

<sup>28</sup> Cohen, Volume V, 468.

<sup>29</sup> Scales, 188.

<sup>30</sup> Ibid, 369.

<sup>31</sup> Ibid, 367.

<sup>32</sup> Carpenter, 40.

<sup>33</sup> Rick Atkinson, Crusade: The Untold Story of the Persian Gulf War (Boston: Houghton Mifflin, 1993), 217.

<sup>34</sup> Ibid, 219.

<sup>35</sup> Ibid, 220.

<sup>36</sup> Ibid, 222.

<sup>37</sup> Ibid.

<sup>38</sup> Ibid, 218.

<sup>39</sup> Scales, 174.

<sup>40</sup> Ibid, 178.

<sup>41</sup> Carpenter, 59.

<sup>42</sup> Ibid, 60.

<sup>43</sup> Ibid, 62.

<sup>44</sup> Melson, 111.

<sup>45</sup> Carpenter, 28.

<sup>46</sup> Ibid, 25.

<sup>47</sup> Ibid.

<sup>48</sup> Ibid, 63.

<sup>49</sup> Ibid, 64.

<sup>50</sup> Atkinson, 464.

<sup>51</sup> Charles J. Quilter II, U.S. Marines in the Persian Gulf, 1990-1991: With the I Marine Expeditionary Force in Desert Shield and Desert Storm (Washington, D.C.: History and Museums Division, Headquarters, U.S. Marine Corps, 1993), 62.

<sup>52</sup> Joint Chiefs of Staff, Doctrine for Joint Interdiction Operations, Joint Publication 3-03 (Washington, D.C.: U.S. Joint Chiefs of Staff, 10 April 1997), II-6.

<sup>53</sup> FM 90-36, II-1.

<sup>54</sup> Ibid, II-2.

<sup>55</sup> Ibid, II-3.

<sup>56</sup> Marine Corps, Deep Air Support, Fleet Marine Force Manual 5-42 (Washington, D.C.: Headquarters, U.S. Marine Corps, 4 March 1993), 1-3.

<sup>57</sup> Mann, 159.

<sup>58</sup> Department of the Air Force, Air Force Basic Doctrine. Air Force Doctrine Document 1 (Maxwell Air Force Base, AL: Headquarters Air Force Doctrine Center, September 1997), 48.

## BIBLIOGRAPHY

"1998 Almanac". Marines. (January 1998): 18.

Atkinson, Rick. Crusade: The Untold Story of the Persian Gulf War. Boston: Houghton Mifflin, 1993.

Carpenter, P. Mason. Joint Operations in the Gulf War: An Allison Analysis. Maxwell Air Force Base, AL: Air University, February 1995.

Cohen, Elliot A. Gulf War Air Power Survey. Washington, D.C.: Office of the Secretary of the Air Force, 1993.

Cooling, Benjamin Franklin, ed. Case Studies in the Development of Close Air Support. Washington, D.C.: Office of Air Force History, 1990.

"Employing A US Army Corps: How the Corps Fights". U.S. Army War College CBNET P drive, 11 September 1998.

Mann, Edward C. III. Thunder and Lightning: Desert Storm and the Airpower Debates. Maxwell Air Force Base, AL: Air University Press, 1995.

Melson, Charles D., Evelyn A. Englander, David A. Dawson. U.S. Marines in the Persian Gulf, 1990-1991: Anthology and Annotated Bibliography. Washington, D.C: History and Museums Division, Headquarters, U.S. Marine Corps, 1992.

Quilter, Charles J. III. U.S. Marines in the Persian Gulf, 1990-1991: With the I Marine Expeditionary Force in Desert Shield and Desert Storm. Washington, D.C.: History and Museums Division, Headquarters, U.S. Marine Corps, 1993.

Scales, Robert H. Certain Victory: The U.S. Army in the Gulf War. Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 1994.

U.S. Department of the Air Force. Air Force Basic Doctrine. Air Force Doctrine Document 1. Maxwell Air Force Base, AL: Headquarters Air Force Doctrine Center, September 1997.

U.S. Department of the Army. JAAT: Multiservice Procedures for Joint Air Attack Team Operations. Field Manual 90-21. Washington, D.C.: U.S. Department of the Army, 3 June 1998.

U.S. Department of the Army. Tactics, Techniques, and Procedures for the Targeting Process. Field Manual 6-20-10. Washington, D.C.: U.S. Department of the Army, 8 May 1996.

U.S. Department of the Army. Targeting: The Joint Targeting Process and Procedures for Targeting Time - Critical Targets. Field Manual 90-36. Washington, D.C.: U.S. Department of the Army, 25 July 1997.

U.S. Department of the Army. Weapon Systems. Washington, D.C.: Office of the Assistant Secretary of the Army (Research, Development, and Acquisition), 1998.

U.S. General Accounting Office. Combat Air Power: Assessment of Joint Close Support Requirements and Capabilities Needed. Washington, D.C.: U.S. General Accounting Office, June 1996.

U.S. Joint Chiefs of Staff. Command and Control for Joint Air Operations. Joint Publication 3-56.1. Washington, D.C.: U.S. Joint Chiefs of Staff, 14 November 1994.

U.S. Joint Chiefs of Staff. Department of Defense Dictionary of Military and Associated Terms. Joint Publication 1-02. Washington, D.C.: U.S. Joint Chiefs of Staff, 23 March 1994.

U.S. Joint Chiefs of Staff. Doctrine for Joint Interdiction Operations. Joint Publication 3-03. Washington, D.C.: U.S. Joint Chiefs of Staff, 10 April 1997.

U.S. Marine Corps. Deep Air Support. Fleet Marine Force Manual 5-42. Washington, D.C.: Headquarters, U.S. Marine Corps, 4 March 1993.

U.S. Marine Corps. MAGTF Aviation Planning. Fleet Marine Force Manual 5-70. Washington, D.C.: Headquarters, U.S. Marine Corps, 8 June 1995.

Warden, John A. The Air Campaign: Planning for Combat. Washington, D.C.: National Defense University Press, 1988.